

MALACOLOGICAL COLLECTIONS—DEVELOPMENT AND MANAGEMENT

BY JOSEPH ROSEWATER

Smithsonian Institution, Washington, D. C.

As a curator in the Recent mollusk section of a large museum, one is often confronted with the question from interested visiting members of the public: "How many shells do you have here in all these cabinets?" One usually reacts by recalling the figure cited for Mollusks in the most recent annual report: "10,058,888" or "somewhat in excess of 10,000,000." The properly impressed visitor often counters with the predictable phrase: "Oh my, but where do they all come from?"

Before going into the answer to that question, at the outset, I should like to emphasize a fact which I believe is largely lost to many persons who like to think "collectively" about collections. Collections of shelled mollusks *are* different from many other kinds of natural history collections. A living *shelled mollusk* is just that; it comes in at least two major parts, the shell and the soft animal which forms the shell. And mollusk collections are almost universally curated in at least two parts also: (1) a collection of dried shells, arranged usually according to the most accepted classification and (2) a collection of preserved soft animals, maintained separately from the dry shells and arranged so as to provide some means of rapid access for study in conjunction with the shells.

This system of collection storage in which two collections actually are maintained may appear unwieldy to many, and it is true that it has come down to us from the last century, although altered in many ways as new materials and methods of handling and storing mollusks came to light. Because the system is old, however, does not mean by definition that it is bad, nor impossible to work with, nor that it should be changed im-

mediately. It means that it is the most satisfactory compromise reached so far for the maintenance of a collection of important animals. By common agreement of Malacologists, the molluscan exoskeleton or shell is the most important single diagnostic tool for the discrimination of species. The collateral softparts contribute additional information concerning species identity and supraspecific relationships.

The collection of dry shells is somewhat unique among categories of biological specimens, although obviously it has much in common with certain other groups of invertebrates, and strangely enough, mammals and birds and, of course, minerals and fossils. But the shell is often a very durable object which endures handling and storage much better than the majority of other specimens. Its catalogue number may be written directly upon it, as well as upon associated labels containing habitat and locality data. Modern shell collections are usually stored directly according to their classification, beginning at one end with the most "primitive" forms and proceeding through the more "advanced" ones. I have often heard the question: "Do you have a card file of the species present in your collection and perhaps a cross-reference file to their geographic data?" No, we do not—and it would be nice to have such a reference, especially one provided by a computer by which specimen data could be extracted in all imaginable ways and correlated. Perhaps when classification of mollusks reaches a sufficiently stable point, it will be profitable to enter their data into such a system. At present, only certain groups are ready for ADP. But we do *not* make lists of the collection, because the collection is arranged in such a way as to form its own list and species may be arranged geographically within this system. One who is familiar with the classification of mollusks can work easily with such a collection after a brief orientation based on individual collection idiosyncrasies.

Mollusks differ also from many other groups in the degree of interest with which they are favored by the layman or amateur. "Breathes there the man (or woman, or child) with soul so dead" that he has never stooped down and picked up a shell during a visit to the seashore? It may be added that a goodly percentage of these persons carry their shells straight to the

curator of mollusks for identification! It is doubtful that any other group of animals is so widely collected by man. Their popularity has often brought on invidious comparison to stamp collecting, another extremely well participated hobby throughout the years.

These introductory remarks have been intended to place in proper perspective the mollusk collection. To the professional malacologist, it is a vehicle for his research, often oriented toward systematic and zoogeographical pursuits. Few groups of mollusks are adequately understood as yet. Some, especially commercially productive ones, have been thoroughly explored and their biology and classification are well known. But tens-of-thousands remain to be studied, and the most feasible way to study the systematics and distribution of these animals is through large series in museum collections.

The question was posed earlier: where did our collections of mollusks come from, that is, how did they develop. In discussing the development of Malacological Collections, I shall limit myself to only a brief consideration of collections outside of the United States, but since collections began abroad, we must start there.

In the writings of Aristotle we find considerable mention of mollusks and so it is apparent that they were important objects of man's interest at a relatively early date. Shells unearthed from the rubble of Pompeii indicate a collection of some sort had been put together there, not only of specimens from the Mediterranean, but from the Indo-Pacific region. Cicero's writings make mention of shell collecting as a relaxation from the tribulations of war and government. It is said that the first large-scale expedition in search of shells took place in 40 A.D. when Caligula led his troops down to the sea in Gaul as if to embark on an invasion of Britain; having drawn them up in battle formation, he ordered them to collect shells—which he called 'the spoils of conquered ocean.'

Our knowledge of the development of Malacology during the Middle Ages, as it is with so many branches of knowledge, is limited to the literature produced in the monasteries. Some quite recognizable species were illustrated in the exquisite illuminated manuscripts of that day.

With the coming of the Renaissance and the age of discovery, natural history cabinets flourished throughout Europe, usually in the hands of rich men who had the time and finances to accumulate such collateral wealth. During this period the first small museums of natural history specimens came into being and some of their most popular contents were well known to have been the shells of mollusks. These collections often were accumulated by or found their way into the hands of noblemen who enlarged them and saw to it that they were conserved. By the 17th and early 18th centuries several of the royal houses of Europe had amassed large collections of shells. The celebrated Linnaeus was commissioned by the queen of Sweden to arrange her shells and upon her collection are based a number of the molluscan species in the 10th edition of "Systema Naturae." Thus, gradually through the assimilation of small and private shell collections by the rich and by royalty, rather massive holdings were acquired which eventually had established for their conservation the Natural History Museums which we know today.

Concerning the development of Malacology in the United States, I should like to quote from an address made by William Healey Dall to the Biological Society of Washington at its 8th Annual Meeting 80 years ago in 1888. Dall said, "I may divide the study of Mollusca in this country into three periods, although these are connected by many intermediate links. The infancy of the science, with a Linnaean classification, has no representation in American conchological literature, which sprang, full-grown, like Minerva from the head of Jove, from the Lamarckian school of Europe. The first period might fitly bear the name of its inaugurator, Thomas Say. It is characterized by a rapid advance in the determination of the fauna, the classification of the species, and the exploration of vast areas. It extended from 1817 to 1841.

"The second period should bear the name of Dr. A. A. Gould. It was inaugurated by his report on the Invertebrata of Massachusetts (1841), and characterized by the broader scope of investigation, and interest in geographical distribution, the anatomy of the soft parts, and the more precise definition and

exact discrimination of specific forms, as exemplified in his writings.

"The third period would be appropriately called after Dr. William Stimpson, who eagerly adopted the radical changes in classification rendered necessary by the discoveries of Loven, and [who] stood ready to welcome the theory of evolution with all the light it shed in dark places."

The name of Thomas Say is much revered in American Malacological circles. He is called the "father" of that branch of science in this country, and was early associated with the first institution in our country to boast a collection of mollusks, The Academy of Natural Sciences of Philadelphia, established in 1812. There were many natural history societies in the years that followed, small local groups of persons who gathered to discuss, collect and study various facets of our new country's natural history. In New England, the Boston Society of Natural History superseded the Linnean Society in the early 1830's. The Smithsonian Institution made its appearance in the middle 19th century with an "instant" mollusk collection accumulated as a result of the U. S. Exploring Expedition. Data gathered for a history of the Division of Mollusks of the U. S. National Museum by Dr. Harald A. Rehder show the Smithsonian collection of mollusks had its beginning as early as 1840 with the organization of the "National Institution for the Promotion of Science" established in part as a repository for the Exploring Expedition collections. In 1860 the Agassiz museum in Cambridge opened with the beginnings of a mollusk collection which would one day absorb the specimens brought together by the Boston Society of Natural History as well as many large private collections.

Of the several large museum mollusk collections of this country today, four of the largest are located in the east: they are at the Museum of Comparative Zoology, the American Museum of Natural History, the Philadelphia Academy and the Smithsonian Institution. Others are at the Museum of Zoology, University of Michigan, the California Academy of Sciences, San Francisco, at Stanford University and at the Los Angeles County Museum. The large collections maintained in these museums are partly the result of specimens returned by expeditions mounted wholly or in part for the purpose of collecting

natural history specimens. But they are in large part also the result of the donations by individuals of anywhere from single specimens to entire private collections consisting of thousands of specimens. And so it was that my original example, the Smithsonian collection of mollusks, came to be estimated to number in excess of 10 million specimens.

I will base my remarks on management of Malacological collections upon my general knowledge of these practices gained through association with the Smithsonian-Division of Mollusks. The task of managing or curating the largest collection of mollusks in the United States, if not in the world, has not been something to be faced by any one curator, for obviously the collection has developed through time. At one time the standard procedure for preparing the shells was to glue them onto glass plates or cardboard or wooden plaques and to inscribe these with the names and other data. Rehder's manuscript history describes how Dall, who as the first virtual curator of mollusks, inherited the collection so prepared for the Smithsonian by P. P. Carpenter. He struggled with these mounted specimens, remounting them as they fell off their plates. Dall, prodded by this unwieldy and space consuming curatorial procedure, finally removed the specimens from the plates and placed them in vials and small trays, each lot with its data-containing label, thus instituting the space conserving procedures used today.

With today's vastly improved transportation more and more persons are getting into the field—more and more both large and small expeditions are being mounted and many of these are bringing back mollusks. Over the past twenty years we have managed to accession an average of 58,000 specimens per year, over a million altogether, the real total of specimens received being in excess of that figure because some collections have not yet been accessioned. On this basis we may plan to expand our collection by approximately 12 percent every 20 years if we keep constant the rate at which material is coming in. Given the personnel and equipment for processing, cataloguing and storage this is not an overwhelming addition to keep up with. But it must be stressed that the rate of addition seems to be on the increase.

We hear a great deal these days that space available for collections is finite and that steps must be taken to fit material into present space. What can be done in the case of mollusks to help the space situation and still maintain an optimum of systematic and geographic coverage and an ample biological series for comparison of morphological variation?

1. Curatorially for many years our dry collection has been at the forefront of any of its size that I have seen. As new material is added to the collection the classification is constantly being updated and old material, which lacks data or which is in poor condition and was kept only because it was the sole example of a species is weeded out. In this way a surprising amount of "bulk" is removed from the collection, making room for pertinent material. Also, as groups of mollusks are critically reviewed during monographic work, their curation is brought up to date. Collections of dry mollusks are admirably adapted for concise storage and anyone examining the Smithsonian collection will find that it contains an enormous amount of material very compactly stored.

2. In addition to careful curatorial procedures some selectivity must be practiced in the acceptance of material for the collection initially and in the retention of specimens already received. At one time we felt that we were compelled to accept and retain almost any collection thrust upon us. The sheer weight of collections which have been known to accumulate in what might be called "such indiscriminate accepting" has shown this to be a mistake. We like to be asked but retain the right to say "no"! Then too, during the processing of large collections, it is often expedient to reserve a portion of many lots for profitable exchanges with other institutions, in this way reducing the bulk to our own collection.

3. A third way of controlling to some degree the sorts of material received for the collection is through specialization. This may take the form of limiting oneself to a particular class, order, or smaller group or by limiting the geographic area of one's major interest. The tendency in Malacology today is to specialize, although those of us who received their training in the "Old School" are used to working in two or more very different major groups more or less interchangeably, for instance:

gastropods and bivalves. A division of labor in the phylum, with responsibilities spread among several curators can make feasible a more efficient curatorial team so long as their goals are somewhat similar. Geographic specialization is practiced to some degree in collections of mollusks. For instance, the Smithsonian collection has lately emphasized the Indo-Pacific faunal area, whereas the MCZ favors the western Atlantic. Both institutions, nevertheless, try to maintain a collection which is balanced and can be utilized for world-wide studies.

There are doubtless many other ways to exert a conscious influence over the development of a museum collection of mollusks, but the preceding three: Careful curation, selectivity and systematic or geographic specialization seem to me to be the most natural ones and they avoid the process of subjectively eliminating large portions of material to make way for others.

For the immediate future I can see a need for the continuance of an orderly accumulation of additional material to collections of mollusks. At the same time, I feel strongly that we should have farthest from our minds the concept that mere accretion is an end in itself. We need to study this material and create a classification which in time may sort itself out to being something near a "natural order." Until this is done I am of the opinion that we will do well to bear in mind two quotations credited to G. Brown Goode in 1895. I think they balance each other nicely. The first: "Curators are apt to err on the side of saving too much"; the second: "A finished museum is a dead museum."

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